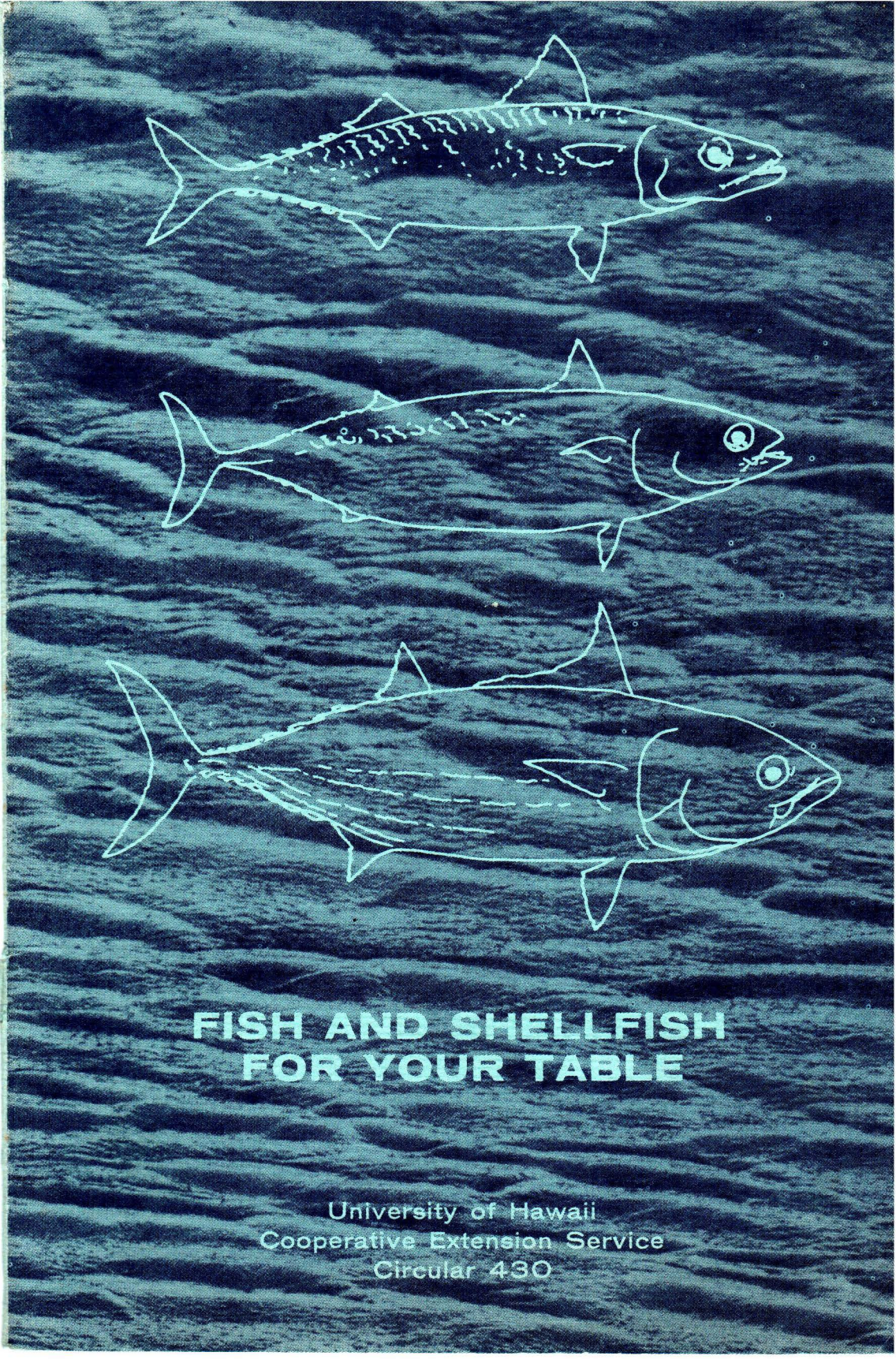

FISH AND SHELLFISH FOR YOUR TABLE

University of Hawaii
Cooperative Extension Service
Circular 430

ACKNOWLEDGMENT

This publication was reproduced by the University of Hawaii Cooperative Extension Service through the courtesy of the Cooperative Extension Service, University of Massachusetts, and the North Carolina Agricultural Extension Service.

Certain information in the publication has been adapted by Frank B. Thomas, visiting Food Science Specialist at the University of Hawaii.

We would like to express our sincere appreciation to Mr. Frank Goto, United Fishing Agency; Mr. Walter Tamashiro, Tamashiro's Market; and Mr. Kenji Ego and Mr. Henry Sakuda, Hawaii State Department of Land and Natural Resources, Fish and Game Division; for their help in modifying this Hawaii edition of "Fish and Shellfish for Your Table."

Through the courtesy of the Cooperative Extension Service of North Carolina and Hawaii this publication has been made available to the public. It is dedicated to all who are a part of the fisheries/seafoods industries of Hawaii.

Frank B. Thomas

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FISH and SHELLFISH for your table

CHARLES E. ESHBACH and KIRBY M. HAYES*

Fish offers many features to give variety, taste appeal, and attractive appearance to meals; it also furnishes essential nutrients. Fish is available in many forms and many species, is convenient to use, and lends itself to countless menu variations.

Yet many food shoppers find difficulty in selecting, preparing, and serving this valuable food. Poor selection, improper storage, and incorrect cooking methods are among the causes of dissatisfaction with the fish dishes they prepare.

All of these problems are easily solved by informed consumers who know the signs which indicate quality, and who are acquainted with the correct preparation and cooking methods.

It is the purpose of this leaflet to suggest ways to select, store, prepare, and cook fish so that the most satisfaction may be obtained from use of this highly-nutritious food.

What to buy, when and how to buy it, how to store and for how long, how to prepare and cook fish are all considered with the aim of enabling the reader to improve purchasing practices, preparation procedures, and cooking methods.

Much data has been reviewed and the recommendations made in the publication reflect the latest research findings.

BUYING FISH

SELECTION AT THE RETAIL COUNTER

Food shoppers who can recognize signs of good quality when purchasing fresh fish, frozen fish, and shellfish are able to make better selections at the retail fish counter.

The flesh, eyes, gills, skin, and odor of the fish and the glazing and the wrapping in which the fish is packaged provide much information about the quality of the fish being offered for sale.

These signs of quality should be kept in mind when buying fish.

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Fresh Fish

When buying **fresh fish,** check to determine that the:

- **Flesh** is firm and elastic and not separating from the bones. In buying fillets, look for a fresh-cut appearance and color that resembles freshly-dressed fish. (As fish gets older, the flesh becomes soft and slimy and slips away from the bones.)
- **Eyes** are bright, clear, transparent, full, and often protruding. (As fresh fish gets older, the eyes become cloudy and often turn pink and become shrunken.)
- **Gills** are red in color and free from slime. (As fresh fish gets older, the gills change in color, fading gradually to a light pink and then becoming gray and eventually brownish and greenish.)
- **Skin** is shiny and with color that has not faded. (As fresh fish gets older, the skin markings and colors that are characteristic of the species become less distinct.)

Frozen Fish

The flesh, odor, wrapping, and glazing are indicators of the quality of frozen fish.

Fish that has been thawed and refrozen loses quality. Fish must be held at zero degrees Fahrenheit or lower to keep quality loss at a minimum. The higher the temperature, the more rapid the loss of quality. Discoloration or a brownish tinge in the flesh is an indication of deterioration. A strong fishy odor is another indication of poor quality.

When buying **frozen fish,** check to determine that the:

- **Flesh** is solidly frozen. (If possible, determine if the fish is held at zero degrees or lower and whether it

had been thawed and refrozen.) The flesh should have no discoloration, brownish tinge, or white cottony appearance.

- **Odor** is not evident or is very slight.
- **Wrapping** in which the fish is packaged is moisture-vapor-proof; there is little or no air space between the fish and the wrapping and there has been no damage to the package material.
- **Glazing** of ice (used to protect shrimp, salmon and halibut steaks or whole fish frozen in the round or dressed form against drying out) is present on these forms of frozen fish.

Shellfish

When buying shellfish, check to see that:

Clams and Oysters In the Shell —

- Are alive.
- The shells close tightly when tapped.

Shucked Oysters —

- Are plump.
- Usually have a natural creamy color (some oysters have a natural tan, brown or black film over the mantle).
- Have clear or slightly opalescent liquid.
- Do not have an excess amount of liquid.
- Have a mild odor.

Cooked Crabs and Lobsters —

- Are bright red.
- Have no disagreeable odor.

Fresh Shrimp —

- Have a mild odor.
- Have meat that is firm in texture.

Cooked Shrimp —

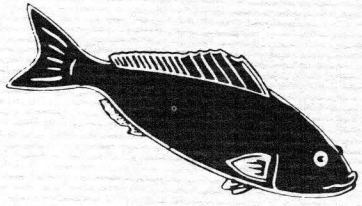
- Have red color in shells.
- Have meat with reddish tint and possibly with some dark red spots.

Scallops —

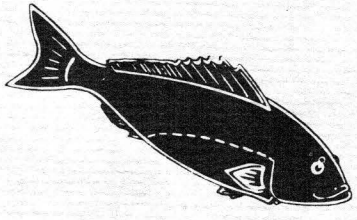
- Have a sweetish odor.
- Are free of excess liquid when bought in packages.

FORMS OF FISH AVAILABLE

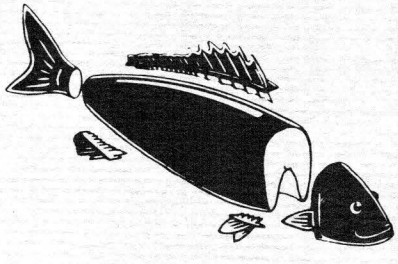
Fresh and frozen fish are available in a variety of cuts or forms. The edible portion varies according to the type of cut. It is about 45 per cent for whole fish and 100 per cent for fillets. The most important cuts include:



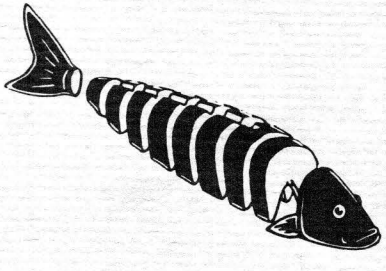
- **Whole or Round.** Fish marketed just as it comes from the water. Needs to be scaled and eviscerated and the head, tail, and fins removed. Yields edible portion of about 45 per cent.



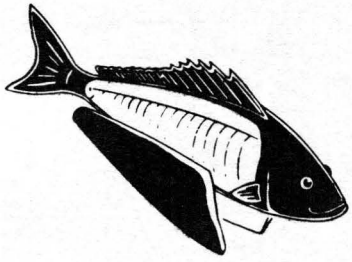
- **Drawn.** Marketed with only the entrails removed. Generally is scaled, with head, tail, and fins to be removed before cooking. Edible portion is about 48 per cent.



- **Dressed.** Scaled and eviscerated, usually with the head, tail, and fins removed. Edible portion is about 67 per cent.



- **Steaks.** Cross-section slices of larger sizes of dressed fish, usually about ¾ inch thick. Yields edible portion of about 86 per cent. It is ready to cook as purchased.



- **Fillets.** The sides of the fish cut away from the backbone. Practically boneless with little or no waste. Ready to cook as purchased.

- **Butterfly Fillets.** The two sides of the fish, corresponding to the two single fillets, held together by the uncut flesh and skin of the belly.

- **Fish Sticks and Fish Portions.** Pieces of fish cut from blocks into portions of uniform width or length. Fish sticks usually measure about 3 inches long and 1 inch wide. Portions are usually larger than sticks, and usually provide one serving. Fish sticks and portions are available breaded, precooked and frozen, as well as breaded and uncooked, and unbreaded and uncooked.

HOW MUCH TO BUY

Generally, it takes **one-third to one-half** a pound of the edible part of fish for each person. In order to provide that much edible fish for each person, buy the following amounts of the different forms:

Fresh and Frozen Fish	**Pounds Per Person**
Fillets, Steaks, or Sticks	1/3
Dressed Fish	1/2
Whole or Round Fish	1

The amount of shellfish needed to provide a serving varies with the cooking method, the size of the shellfish, the recipe used, and the size of servings. The following amounts are good general guides:

Shellfish	**Amounts Needed to Serve Six**
Oysters and Clams	
In the Shell	3 dozen
Shucked	1 quart

Scallops	1 to 2	pounds
Shrimp		
Headless (fresh or frozen)	1½ to 3	pounds
Cooked Meat	¾ to 1½	pounds
Lobsters		
Live	4 to 6	pounds
Cooked Meat	¾ to 1½	pounds
Crabs (Hard)		
Live (18-36 crabs)	6 to 12	pounds
Cooked Meat	1 to 2	pounds

Shellfish

Shellfish is available in the following forms:

- **In the Shell.** Clams, lobsters, crabs, and oysters are available in this form. They should be alive when purchased. They can be cooked in the shell. There is great variation in edible portion.
- **Shucked.** Clam, oyster, and scallop meats are available without shells. All the meat is edible.
- **Headless.** Only the tail part of shrimp usually goes to market. It is about 50-60 per cent edible.
- **Cooked Meat.** This is the edible portion peeled from cooked lobster, crab, and shrimp. It is 100 per cent edible. This is a perishable product and requires refrigeration.

EDIBLE PORTION

The edible portion of fish varies according to the form in which the fish or shellfish is bought, the season in which it is caught, and the variety of the fish.

Following are some approximate percentages of the edible portion for each form of fish and shellfish:

Fish	**Edible Percentage**
Whole or Round	43 to 47
Drawn (Eviscerated only)	46 to 50
Dressed (Eviscerated, head and fins removed)	65 to 69
Steaks	84 to 88
Fillets	100
Shellfish	
Clams, Hard (In shell)	14 to 20
Clams, Soft (In shell)	23 to 33
Oysters (In shell)	8 to 11
Lobsters (Cooked in shell)	35 to 37
Crabs, Hard (Cooked in shell)	10 to 18
Clams (Shucked)	100
Oysters (Shucked)	100

Scallops	100
Shrimp (Headless, raw)	50 to 60
Cooked Meat —	
Lobsters	100
Crabs	100
Shrimp	100

SEASONALITY OF SUPPLY AND PRICE

Supply

Supplies of fresh fish have seasonality. Most types are in larger supply in some months of the year than in others. Also, when a particular variety is most plentiful in local waters, the boats are making their catches in a shorter period of time and the fish arrive at the market in better condition.

Fish are frozen during the seasons of plentiful supply and supplies in storage are large enough so that most varieties of frozen fish are now available throughout the year.

Fresh fish and frozen fish can be used interchangeably, since they differ little in appearance, flavor, and nutritive value when handled correctly and held under the right storage conditions.

(For an indication of months of largest supply for important Hawaii varieties of fish, based on landings in Hawaii ports, see chart on page 20 under the heading "Seasonality of Supply.")

Price

Retail prices of most fish show relatively little change from season to season, especially in recent years when there have been much larger supplies of frozen fish available. However, seasonal supplies do have some effect on prices, especially of those fish which are in large supply in only a few months of the year.

Keep in mind that price alone does not indicate value. Quality of what is purchased and the use to which it is put are also important factors in determining value.

GRADES OF FISH

There are no Federal standards or grades for fresh fish. But there are official standards for a number of the frozen and pre-cooked fish items.

Standards are available for these frozen fish items: Fish sticks, raw-breaded shrimp, fish blocks, haddock fillets, halibut steaks, raw-breaded fish portions, cod fillets, ocean perch fillets, frozen raw headless shrimp, flounder fillets, sole fillets, fried scallops, and salmon steaks.

What the Grades Represent

There are four grades: U. S. Grade A, U. S. Grade B, U. S. Grade C, and Substandard. Generally, the grades represent these quality conditions:

U. S. Grade A — Denotes a frozen product that has a good flavor and odor and rates high in the particular factors that apply to the particular product. These include such things as color of the flesh, dehydration, freedom from undesirable small fillet pieces, uniformity of thickness of steak, uniformity of size and shape and weight, freedom from bones and blemishes, and having only small defects such as improper packing, cutting, and trimming imperfections, honeycombing, and blemishes.

U. S. Grade B — Denotes a frozen product that has a reasonably good flavor and odor and rates reasonably high in the other factors considered in grading frozen fish products.

U. S. Grade C — Applies only to frozen raw headless shrimp. The rating for flavor and odor must be reasonably good but the rating for other factors is lower than Grade B.

Substandard — Denotes the quality of a frozen product that fails to come up to the requirements of U. S. Grade B or C.

Wisest Choice Is Usually U. S. Grade A

Selection of U. S. Grade A frozen fishery products is usually the wisest choice when a graded product is available. While this grade may cost a little more, there is a lot of economy and satisfaction from the top grade, since it offers better appearance and quality. Check for U. S. Grade markings on the package.

HANDLING AND STORAGE OF FISH

Fish is a highly perishable commodity which will spoil quickly unless it is handled with care and kept under refrigeration until time to use it.

How Quality Is Lost

There are four ways in which quality is easily lost in fresh and

frozen fish — and there are certain things that can be done to prevent or at least reduce this quality loss.

Growth of Bacteria increases in fish when sanitation in handling fish is poor and when the storage temperature is not lowered promptly at the time the fish is taken from the water. Bacterial action will not occur to any appreciable extent when fish is frozen and stored at very low temperatures and remains under those conditions.

Oxidation of the oil or fat of the fish can cause the fish to become rancid. This can happen to frozen fish even when held at low temperatures. It can usually be recognized by a yellow discoloration on the surface of the skin or on the flesh of the fish that is exposed to the air or by a change in flavor or odor. Wrapping the fish in any of the moisture-vapor-proof wrappings now available, or glazing frozen fish with a thin coating of ice, will keep the air away and greatly reduce oxidative changes.

Action of Enzymes in the flesh of the fish causes another type of spoilage. These enzymes, performing a natural building and destroying function during the normal life processes of the fish, are kept well under control as long as the fish is alive. While the enzyme action cannot be stopped entirely after the fish die, the temperature at which the fish is held in storage can control the action to the extent that fish held under good storage conditions do not lose quality.

Dehydration is another way in which quality is lost. Fish put directly into zero-degree refrigeration without any protective covering will lose moisture quite rapidly until the fish becomes shrunken and dried. This dehydration not only spoils the appearance of the fish, but also alters the texture and causes a loss of weight and flavor. This drying out is known as freezer burn when it occurs in the freezer.

Storing Fresh Fish

Wrap fresh fish in moisture-vapor-proof paper, or put it in a tightly covered dish and store it in the coldest part of the refrigerator. If fish is wrapped or covered in this way the quality will be maintained and the odor won't affect other foods in the refrigerator.

To maintain the quality of fresh fish, keep it below 40 degrees F. Better yet, keep it at 30 or 32 degrees F., if you have refrigeration facilities that will do so.

Storing Frozen Fish

Keep frozen fish in the unopened package until time to use it. Storage life varies with the type of storage compartment. Frozen fish can be stored for a week in ice cube compartments, a month in across-the-top freezer compartments, and 6 months in two-door refrigerator-freezer units or home freezers. (It will remain in good condition for up to a week in the freezing unit of the refrigerator, provided the freezing unit is operating efficiently.)

Keep frozen fish solidly frozen and don't refreeze fish that has been thawed. Keep in mind the fact that, even though a food is frozen hard, there can still be loss of quality at temperatures above zero degrees F. So, if you want to get the maximum storage life from frozen fish, keep it at zero degrees F. or lower and, be sure that it is adequately protected by moisture-vapor-proof wrapping or by glazing with ice.

Storing Shellfish

Fresh shellfish should be stored at temperatures near 32 degrees. Much quality can be lost in a couple of hours if the temperature is even a few degrees higher than that. It is very important to keep fresh or cooked shellfish meats from becoming contaminated by bacteria, as they are easily spoiled.

Keeping Frozen Fish at Zero Degrees F.

Frozen fish that was of good quality when frozen and that was handled correctly until reaching the storage freezer — and that is then kept at zero degrees F. or lower until used — should stay in good condition for the periods indicated on the chart.

Approximate Storage Life of Frozen Fish and Shellfish Held at Zero Degrees Fahrenheit

Fatty Fish	**Months**
Mackerel, Salmon, Tuna, etc.	Three
Lean Fish	
Haddock, Cod, Swordfish, etc.	Six
Shellfish	
Lobsters and Crabs (Meat)	Two
Shrimp	Six
Oysters, Scallops, Clams (Shucked)	Three to Four

NUTRITIVE VALUES

Fish rates very high as a source of protein, minerals and vitamins. Fish and shellfish can be used to provide high quality food in the diets of people of all ages. Here is how fish rates in the principal nutritive values:

Protein — An excellent source of very good and easily digested protein. A generous serving (4 ounces) of fish will provide about a third of the daily protein requirement of an adult. Nutritionists recommend that about a third of the protein eaten daily come from animal

sources to balance less complete cereal protein and vegetable protein. Fish or shellfish will meet this need.

Vitamins — Fat fish such as mackerel, salmon, and herring are rich in vitamins A and D. All fish oils are rich in vitamin D. All fish, both fat and lean types, contain some of the B vitamins. This means that fish contributes generously to the vitamin need of the body for growth and maintaining well-being.

Minerals — The mineral content of fish is similar, in general, to that of beef, except that fish provides more iodine and other needed trace minerals such as cobalt and zinc. In fact, no other food contains so much iodine as salt water fish and shellfish. This is an element needed by the body that is not found in many foods.

Other minerals found in generous amounts in fish and shellfish include copper, iron, magnesium, and phosphorus. Some fish are excellent sources of calcium, especially those of which the bones are eaten.

Fish is an excellent source of food value. Flavor, texture, and color have an important part in determining the choice.

PREPARATION AND COOKING OF FISH

Thawing Frozen Fish

You can cook frozen fish, fillets, and steaks in their frozen form, if you allow enough additional cooking time. But if fish are to be breaded and fried or stuffed, it's more convenient to thaw them first to make handling easier. Thawing is necessary before preparation if you are going to clean and dress whole or drawn fish.

Here are some methods for thawing fish:

At Refrigerator Temperatures — Thawing at refrigerator temperatures of 40 to 45 degrees F. is the recommended method for thawing frozen fish. Hold the fish at this temperature only until it is easy to handle. A one-pound fillet will thaw in about 18 hours.

Using Cold Running Water — The quickest method for thawing whole or drawn fish is to put them in cold running water. Leave fillets and steaks in the package while they are being thawed. The thawing time will vary, depending on the shape and size of the fish. It takes about a half-hour to thaw fillets and steaks in cold water.

At Room Temperatures — This type of thawing is not recommended, though it is often used. The thinner parts of the fish, such as the part near the tail, thaw faster than the rest, and if the thawing period is too long, spoilage can start in the parts that thawed earliest. It takes from three to four hours to thaw a package of fillets this way.

Crushed Ice — Putting whole or drawn fish in a bed of crushed ice is another method of thawing frozen fish. This is a much slower method, however, and is not used to any great extent.

Generally, thaw frozen fish at refrigerator temperatures whenever possible. If a quicker method is used, thawing in cold running water is recommended.

COOKING OF FISH AND SHELLFISH

The correct cooking of fish is as important as good selection and storage, if the most satisfaction is to be obtained.

Rules for Cooking Fish

Here are a few simple rules for fish cookery that will do much to insure success.

- **Cook fish quickly and for as short a time as possible.**
  Over-cooking is the most common fish cooking mistake. Cooking too long draws out most of the natural juices and the flesh shrinks and dries out. Fish doesn't need the slow cooking that is used for meat. The sinews that hold together the fibres in fish are jelly-like and are tender. They soften right away when heat is applied.
- **Save any juices that are formed, or any liquid in which the fish is cooked.**
  These juices or liquid can be used in sauce to serve with the fish or for use in soup. Cook the bones of boned fish and use the liquid for sauce or soup.
- **Salt the fish before cooking.**
  This brings out the flavor.
- **Test with fork to see when the fish is done.**
  The fish is done when it is tender, separates from the

bones, and flakes easily. Flaking means pulling the flesh of the the fish apart in loose folds or flakes with a fork.

- **Serve fish on a heated platter with sauce or garnish.** Fish is at its best when it is cooked lightly and served as soon as possible after it has been cooked.

METHODS OF COOKING

There are several principal methods of cooking fish. These include:

- Simmering, poaching, boiling, or steaming.
- Baking.
- Broiling.
- Frying.

In general, the method to use depends on whether the fish is a fat or a lean species.

Fat fish have oil throughout the flesh. Lean fish have the oil concentrated in the liver which is removed when the fish is cleaned. So, lean fish have a drier flesh.

Fat Fish include mackerel, salmon, and tuna.

Lean Fish include cod, haddock, flounder, sole, pollock, whiting, swordfish, and halibut.

All Shellfish are lean.

Almost any kind of fish is good when fried or broiled. Some people consider fat fish best for baking and, lean fish best for boiling, steaming, and for chowders. But any fish can be cooked by the basic cooking methods if allowance is made for the fat content.

Since there are only a few basic rules for fish cookery, variety is obtained by using different cooking methods and by using different sauces and seasonings.

STEAMING OR BOILING

Boiling

Boiling is a good economical way to cook thick fish steaks, fish that is to be served cold, or fish for serving at more than one meal. Left-over fish may be broken into flakes and prepared quickly in such dishes as salads, hash, and creamed dishes.

Steaming

Place fish in a colander, in a metal basket with legs, or in cheese-cloth.

Put 1½ to 2 inches of water in kettle. When it boils, add the fish.

Steam for 15 minutes per pound or until the fish flakes easily.

Place on a heated platter, add salt, and serve with a sauce or garnish.

Quick New England Fish Chowder

Cut a ½-pound fillet in about 1-inch cubes.

Fry 2 teaspoons of diced salt pork until crisp and golden brown.

Add ¼ cup chopped or sliced onions and brown slightly.

Add 1½ cups of hot water and 1½ cups of diced potatoes, and cook 10 minutes or until the potatoes are partially tender.

Add the fish, turn the heat to simmer, and cook until the fish can be flaked easily when tested with a fork.

Add 1½ cups of milk, and salt and pepper; and heat.

Serve immediately with chopped parsley sprinkled over the top. Serves 3 or 4.

BAKING

Whole fish, fillets, or steaks may be baked. Whole fish may be baked stuffed, and fillets may be baked with the dressing separate.

Fat fish such as mackerel are best for baking whole, as the fish cooks in its own fat and requires no basting. Also, the skin stretches without cracking.

When baking lean fish, score the skin a few times and insert slices of salt pork. Or, rub it with melted butter and keep it well basted while cooking.

Baking

Cut a pound of fish fillets or steaks into serving portions.

Sprinkle both sides with salt and pepper. Add 1 tablespoon of lemon juice and 1 teaspoon of grated onion to 2 tablespoons of butter or other melted fat.

Dip each piece of fish into the mixture and place in a greased baking pan. Pour the rest of the fat over the fish.

Bake in a moderate oven at 350 degrees F. for about 25 to 30 minutes, or until the fish flakes easily when tested with a fork.

Sprinkle with paprika and serve immediately on a hot platter. Serves 3 or 4.

Baking Stuffed Fish

Clean, wash and dry 2 pounds of dressed fish. Sprinkle inside and out with salt.

Stuff the fish loosely with bread stuffing and sew the opening with needle and string or close with skewers.

Place the fish in a greased pan. Brush with melted fat.

Bake in a moderate oven at 350 degrees F. for 40 to 60 minutes, or until the fish flakes easily when tested with a fork.

If the fish seems dry while baking, baste occasionally with dripping or melted fat.

Remove string or skewers and serve immediately on a hot platter, either plain or with a sauce. Serves 3 or 4.

BROILING AND FRYING

For broiling, fillets or steaks are preferred. Small fish may be broiled whole. Larger fish should be split and the backbone removed.

Fish may be fried either in deep fat or by pan-frying or sauteing. Pan-frying or sauteing (cooking the fish in a pan with just enough fat or oil to keep it from sticking) is a good method for small fish, fillets, or steaks that are about a half-inch thick.

Deep fat frying (cooking in enough fat to cover the fish completely) is a good method for cooking small fish, fishcakes, croquettes, shellfish such as oysters and clams, shrimp or scallops.

Getting Fish Ready To Broil Or Fry

Use fish fillets, steaks, or small flat dressed fish.

Wipe the fish with a damp cloth.

Salt on both sides.

For **broiling,** brush with melted fat, unless the fish is a fat variety. For **frying,** dip in milk or in a mixture of 1 egg and ½ cup milk, and then into a mixture of ¼ cup flour and ¼ cup cracker meal.

Broil or fry, using one of the following methods:

Broiling

Put the fish on a greased broiler rack, skin side down.

Place in a broiler with the pan about two inches from the source of heat. Brush with melted fat and broil for 5 to 8 minutes or until slightly brown. Turn the fish over, brush with melted fat and broil 5 to 8 minutes.

Pan Frying

Heat a frying pan containing a small amount of fat. Place the fish in the pan carefully.

Fry until a golden brown. Keep the heat moderate. Turn and brown the other side.

Serve on a heated platter with lemon wedges or a sauce.

Deep Fat Frying

Cut 1 pound of fillets, steaks, or pan-dressed fish into serving-size portions.

Sprinkle both sides with salt and pepper.

Beat 1 egg slightly and blend in 2 teaspoons of milk or water.

Dip the fish in the egg and roll in ½ cup of bread crumbs, cracker crumbs, cornmeal, or flour.

Use a deep kettle with a frying basket and enough fat to cover the fish, but do not have the kettle more than half full of fat. Heat the fat to 350 degrees F.

Place a layer of fish in the frying basket and cook to an even golden brown, about 3 to 5 minutes.

Raise the basket, remove the fish, and drain on a paper towel.

Serve immediately on a hot platter, plain or with a sauce. Serves 3 or 4.

COOKING SHELLFISH

Shrimp Cocktail

Wash 1 pound of shrimp and place in 1 quart of rapidly-boiling water, salted with 3 tablespoons of salt.

Cover and bring to a boil. Simmer 5 minutes.

Drain, peel, and remove sand vein. Chill.

Place shrimp in lettuce cup in cocktail glasses with 1 tablespoon of cocktail sauce in center.

Serves 3 or 4.

Hard-Shell Clam Pie

Remove black section from stomachs of 2 cups of shucked clams. Chop hard part finely.

Combine with ¼ cup clam liquid, 4 tablespoons of butter, 1 beaten egg, 1 cup milk, 2/3 cup cracker crumbs, salt and pepper.

Pour into a deep pie shell. Cover with upper crust and bake in hot oven, reducing the heat after the first ten minutes.

Bake slowly 1 hour. Serves 3 or 4.

Oyster Stew

Strain 1 pint of oysters, keeping the liquid.

Heat oysters slowly in 3 tablespoons of butter or margarine until their edges begin to curl.

Add the oyster liquid and then add 3 cups of hot milk.

Season and serve with a garnish of chopped parsley, finely chopped celery leaves, tips of green onions, or paprika. Makes 3 large or 4 medium servings.

Scalloped Oysters

Mix ½ cup bread crumbs and ½ cup cracker crumbs with ½ cup melted butter or margarine.

Put 1/3 of the crumbs in the bottom of a shallow oiled baking dish.

Cover the oysters and sprinkle with salt and pepper.

Add 2 tablespoons of oyster liquid and 1 tablespoon of milk or cream. Repeat.

Cover with the remaining crumbs. Have only 2 layers to be sure that all the oysters are properly done.

Bake 30 minutes at 400 degrees F. Makes 3 large or 4 medium servings.

ADDING CONTRAST IN COLOR AND FLAVOR

Serve fish in ways in which it makes an appealing colorful dish and provides contrasts in flavor.

Contrast can be obtained by serving fish with crisp vegetables that have color, such as beets, red cabbage, tomatoes, cucumbers, or broccoli.

Use garnishes such as sliced lemon or orange, parsley, sliced tomatoes, watercress, radishes, cucumbers, sliced hard-cooked eggs, sliced pickled beets, sliced or chopped pickled cucumbers, stuffed olives, or paprika.

Relishes and green salads with dressings provide good flavor contrasts. Acid flavors combine well with fish, especially fat fish. That's why lemon is so popular with fish unless a thick sauce is served.

Sauces add much to the taste of fish. Use sauces such as Hollandaise, tartar, creole, cucumber, lemon, egg, Spanish, and mushroom.

Spices that go well with fish dishes include basil, bay, marjoram, parsley, saffron, savory, tarragon, and thyme.

SEASONALITY OF SUPPLY

(Based on 1967 catches)

SPECIES — FINFISH	SEASON IN MONTHS	LARGEST SUPPLY
Aku — Skipjack tuna	Jan.-Dec.	June, July, Aug.
Ahi — Yellowfin tuna	Jan.-Dec.	June, July, Aug.
Akule — Mackeral scad	Jan.-Dec.	May, June, July, Aug. Sept., Oct.
Amaama — Mullet	Mar. through Nov.	Mar.
A'u — Billfish	Jan.-Dec.	Dec.
Hapuupu — Sea Bass	Jan.-Dec.	Jan., Feb., Sept.
Kahala — Amberjack	Jan.-Dec.	Jan., Feb., Mar., Apr., Dec.
Kumu — Goatfish	Jan.-Dec.	Jan. (1966)
Mahimahi — Dolphin	Jan.-Dec.	July, Aug., Sept.
Moana — Goatfish	Jan.-Dec.	Apr., May, June, Sept., Oct. (1966)
Opakapaka — Snapper	Jan.-Dec.	Jan., Feb., Mar., Dec.
Opelu — Mackeral	Jan.-Dec.	Aug., Sept., Oct.
Oio — Bonefish	Jan.-Dec.	Apr., May, Sept., Dec.
Puhi — Eel	Jan.-Dec.	
Ulua — Jack crevelle	Jan.-Dec.	Jan., Sept.
Weke — Goatfish	Jan.-Dec.	Jan., Feb.

SPECIES — SHELLFISH		
Crab-Kona — Kona Crab	Jan.-Dec.	May, June, July
Opae — Shrimp	Jan.-Dec.	
Ula — Lobster	Jan. through May Sept. through Dec.	May, Sept. (1966)
Hee — Octopus	Jan.-Dec.	July, Aug., Sept., Oct.
Muhee — Squid	Jan.-Dec.	Aug., Sept., Oct. (1966)
Opihi — Limpet, saltwater	Jan.-Dec.	Jan., May, June

ALGAE		
Limu — Seaweed	Jan.-Dec.	

LOCAL, COMMON, AND SCIENTIFIC NAME OF DIFFERENT SPECIES OF FISH CAUGHT BY COMMERCIAL FISHERMEN IN HAWAIIAN WATERS

Local Name	Common Name	Scientific Name
A'awa	Spot Wrasse	*Bodianus bilunulatus*
Ahaaha	Needle Fish	*BELONIDAE (3 species)*
Ahi (Menpachi shibi)	Bigeye Tuna	*Parathunnus sibi*
Ahi (Maguro)	Bluefin Tuna	*Thunnus orientalis*
Ahi	Yellowfin Tuna	*Neothunnus macropterus*
Ahipalaha (Tonbo)	Albacore Tuna	*Germo alalunga*
Aholehole	Mountain Bass	*Kuhlia sandvicensis*
Aku (Katsuwo)	Skipjack Tuna	*Katsuwonus pelamis*
Akule (Aji)	Bigeyed Scad	*Trachurops crumenophthalmus*
Alaihi	Squirrel Fish	*HOLOCENTRIDAE (15 species)*
Amaama	Mullet	*Mugil cephalus*
A'u (Kajiki)	Pacific Blue Marlin	*Makaira ampla*
A'u (Naraigi)	Striped Marlin	*Makaira audax*
A'u	Broadbill	*Xiphias gladius*
A'u (Indian Fish)	Shortnosed Spearfish	*Tetrapterus angustirostris*
A'u	Black Marlin	*Istiompax marlina*
A'u (Misc.)	Unclassified	*ISTIOPHORIDAE*
A'u lepe	Sailfish	*Istiophorus orientalis*
Awa	Milkfish	*Chanos chanos*
Awaawa	Ten Pounder	*Elops hawaiensis*
Aweoweo	Red Bigeye	*PRIACANTHIDAE (4 species)*
Ea	Wrasse	*LABRIDAE*
Hanui	Parrot Fish	*SCARIDAE*
Hapuupuu	Sea Bass	*Epinephelus quernus*
Hauliuli	Snake Mackerel	*Gempylus serpens*
Hihimanu	Ray	*DASYATIDAE*
Hilu	Wrasse	*Coris flavovittata*
Hinalea	Wrasse	*LABRIDAE*
Humuhumu (Hage)	Triggerfish	*BALISTIDAE*
Iao (Togoro)	Silverside	*Pranesus insularum*
Iheihe	Halfbeak	*HEMIRAMPHIDAE*
Kahala	Amberjack	*Seriola dumerilii*
Kaku	Barracuda	*Sphyraena barracuda*

Local Name	Common Name	Scientific Name
Kala	Surgeon Fish	*Naso unicornis*
Kalikali	Pink Snapper	*Pristipomoides sieboldii*
Kamanu	Hawaiian Salmon	*Elagatis bipinnulatus*
Kawakawa	Little Tuna	*Euthynnus yaito*
Kawelea	Japanese Barracuda	*Sphyraena helleri*
Kihikihi	Moorish Idol	*Zanclus canescens*
Kole	Surgeon Fish	*Ctenochaetus strigosus*
Kumu	Red Goat Fish	*Parupeneus porphyreus*
Kupipi	Damsel Fish	*Abudefduf sordidus*
Kupoupou	Mongoose Fish	*Cheilio inermis*
Lae	Leatherback	*Scomberoides sancti-petri*
Laenihi (Nabeta)	Razor Fish	*Iniistius pavoninus*
Lauwiliwili (Y. Manini)	Long Nose Butterfly Fish	*Forcipiger longirostris*
Lehi	Snapper	*Aphareus rutilans*
Mahimahi	Dolphin	*Coryphaena hippurus*
Maiii	Surgeon Fish	*ACANTHURIDAE*
Maiko	Surgeon Fish	*Acanthurus nigroris*
Maikoiko	Surgeon Fish	*Acanthurus leucopareius*
Makiawa	Sardine	*Etrumeus micropus*
Mallatea	Wrasse	Not found in Hawaii
Malolo	Flying Fish	*EXOCOETIDAE*
Malu	Goat Fish	*Parupeneus pleurostigma*
Manini	Convict Tang	*Acanthurus sandvicensis*
Mano	Shark	
Mano Kihikihi	Hammerhead Shark	*Sphyrna lewini*
Mamao (Mamo)	Damsel Fish	*Abudefduf abdominalis*
Moano	Goat Fish	*Parupeneus multifasciatus*
Moelua	Red Goat Fish	*Mulloidichthys pflugeri*
Moi	Thread Fin	*Polydactylus sexfilis*
Mola Mola	Ocean Sunfish	*MOLIDAE*
Mu	Porgy	*Monotaxis grandoculis*
Naenae	Orange Spot Tang	*Acanthurus olivaceus*
Nehu	Anchovy	*Stolephorus purpureus*
Nenue	Rudder Fish	*Kyphosus cinerascens*
Nohu (Hogo)	Common Scorpin	*Scorpanenopsis cacopsis* and *gibbosa*
Nunu	Stick or Trumpet Fish	*Aulostomus chinensis*
Oililepa	File Fish	*Alutera scripta*

Local Name	Common Name	Scientific Name
Oio	Bonefish	*Albula vulpes*
Omaka	Omaka	*Caranx mate*
Ono	Wahoo	*Acanthocybium solandri*
Oopuhue	Balloon Fish	*Arothron hispidus*
Opah	Ocean Moonfish	*Lampris regius*
Opakapaka	Pink Snapper	*Pristipomoides microlepis*
Opelu	Mackeral Scad	*Decapterus pinnulatus*
Opelu Mama	Mackeral Scad	*Decapterus pinnulatus*
Opule	Spotted Wrasse	*Anampses cuvieri*
Pakii	Flounder	*Bothus mancus, B. panterinus*
Pakuikui	Achilles Tang	*Acanthurus achilles*
Pala	Yellow Tang	*Zebrasoma flavescens*
Palani	Surgeon Fish	*Acanthurus dussumieri*
Panuhunuhu	Parrot Fish	*SCARIDAE*
Paopao	Yellow Ulua	*Gnathanodon speciosus*
Pauu	Squirrel Fish	*Myripristis chryseres*
Piha	Small Round Herring	*Spratelloides delicatulus*
Pualu	Surgeon Fish	*Acanthurus xanthopterus*
Puhi	Eel	*MURAENIDAE*
Puhi (Tohe)	White Eel	*Conger marginatus*
Saba	Japanese Mackerel	*Scomber japonicus*
Uhu	Parrot Fish	*SCARIDAE*
Ukikiki (Gindai)	Snapper	*Rooseveltia brighami*
Uku	Gray Snapper	*Aprion virescens*
Ulaula (Ehu)	Red Snapper	*Etelis marshi*
Ulaula Koae (Onaga)	Red Snapper	*Etelis carbunculus*
Ulua	Jack Crevally	*CARANGIDAE (13 species)*
Ulua Kihikihi (Kagami)	Thread Crevally	*Alectis ciliaris* and *A. indicia*
Ulua Omilu (Hoshi)	Blue Crevally	*Caranx melampygus*
Uouoa	False Mullet	*Neomyxus chaptalii*
Upapalu	Cardinal Fish	*Apogon snyderi*
Uu (Menpachi)	Squirrel Fish	*Myripristis argyromus, M. berndti, M. multiradiatus*
Uukanipo	Squirrel Fish	*HOLOCENTRIDAE*
Walu	Oil Fish	*Ruvettus pretiosus*
Weke	Goat Fish	*Mulloidichthys samoensis*

Local Name	Common Name	Scientific Name
Weke-ula	Red Goat Fish	*Mulloidichthys auriflamma*
FRESHWATER:		
Carp	Carp	*Cyprinus carpio*
Catfish	Catfish	*Clarias fuscus*
Oopu	Gobie and Electrid	*GOBIIDAE & ELEOTRIDAE*
Panchon or Pongee	Snake Head	*Ophiocephalus striatus*
Tilapia	Tilapia	*CICHLIDAE*
CRUSTACEANS:		
Crab—papai	Unclassified	
Crab—Kona	Kona Crab	*Ranina serrata*
Crab—Kuahonu	White Crab	*Portunus sanguinolentus*
Crab—Moala	Red Crab	*Podophthalmus vigil*
Crab—Samoan	Samoan Crab	*Scylla serrata (Forskal)*
Opae	Shrimp	
Ula	Lobster	*Panulirus japonicus, P. penicillatus*
Ulapapapa	Slipper Lobster	*Paribaccus antarcticus*
MOLLUSKS:		
Olepe	Clam	*Venerupis (Ruditapes) Philippinarum*
Hee (Tako)	Octopus	*OCTOPODA*
Muhee (Ika)	True Squid	*DECAPODA*
Hihiwai	Limpet—Freshwater	
Opihi	Limpet—Saltwater	*Helcioniscus exaratus, H. argentatus*
Pupu	Limpet—Freshwater	
ECHINODERMS:		
Ina	Urchin	*Tripneusta gratilla*
Wana	Sea Urchin	*Centrechinus paucispinus*
Loli (Namako)	Sea Cucumber	*HOLOTHURIDAE*
REPTILES:		
Honu	Turtle (Green)	*Chelonia mydes*
ALGAE:		
Limu	Sea Weed	

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Cooperative Extension Work in Agriculture and Home Economics
College of Tropical Agriculture, University of Hawaii, Honolulu, Hawaii 96822
United States Department of Agriculture Cooperating
C. Peairs Wilson, Director, Hawaii Cooperative Extension Service
Distributed in Furtherance of the Acts of Congress of May 8 and June 30, 1914

CIRCULAR 430—DECEMBER 1968